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ABSTRACT

The study investigated academic, behavioral, and psychological test performance of children diagnosed as emotionally disturbed, minimally brain injured, of dull normal intelligence, or suffering from a specific learning disability, respectively. Participating were 132 children, whose mean age was 9 years, 7 months. Multidisciplinary evaluation was used. Psychological test battery included Wechsler Intelligence Scale for Children full scale, verbal, and performance IQ's, Raven Progressive Matrices, Wide Range Achievement Test Reading, spelling and arithmetic subtest, and Bender Gestalt scaled scores. School grades and teacher ratings were also utilized. It was concluded from the testing results that psychometric test scores along were not sufficiently effective in distinguishing amont the disabilities. The most effective means of evaluation was found to be the teacher ratings. (CB)

National Association of School Psychologists, Chicago, Illinois, 1972

DIFFERENTIAL ACADEMIC, BEHAVIORAL, AND PSYCHOLOGICAL TEST PROFILES OF FOUR TYPES OF LEARNING HANDICAPPED CHILDREN

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The determination of whether a child's learning difficulties are primarily due to emotional causes, central nervous system dysfunction, low intellectual ability, or some specific learning disability represents a common diagnostic problem for psychologists who work with school age children. Unfortunately, there has been little systematic study toward the identification of profiles which would provide good differentiation between each of these four diagnostic categories. Earlier work (Hartlage, 1970) has demonstrated the traditional use of psychometric test instruments is of relatively little value in differentiating among these diagnostic categories, and suggested that broader, more comprehensive approaches toward differential diagnosis may be indicated.

The present investigation studied academic, behavioral, and psychological test performance of children diagnosed as either emotionally disturbed, minimall brain injured, of dull normal intelligence, or suffering from a specific learning disability, respectively; using a number of various measurement instruments, in an attempt to determine if there may be certain profiles characteristic of children in each diagnostic group which differentiate them from children in each other group.

METHOD

Subjects: One hundred thirty-four children were involved in the study. Mean WISC IQ was 99, and mean age was 9 years, 7 months. On the basis of multidisciplinary evaluation, 39 children had been classified as minimally brain injured, 28 as emotionally disturbed, 36 as being specific learning disabled, and 31 as being of dull normal intelligence. Children in the dull normal intellectual classification earned a mean WISC IQ of 84. These IQ scores were not included in the overall IQ means, since they would have produced an artifactual skew in the overall IQ distribution. Only cases where the four diagnostic categories were essentially mutually exclusive were considered, so that there were no children in the sample who were considered to present evidence of problems in more than one of the four diagnostic categories. Twenty-five were girls and one hundred nine were boys.

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Measurements: Psychological test variable measures included Wechsler full scale, verbal and performance IQ's, each individual WISC subtest scaled score, Raven Progressive Matrices, Wide Range Achievement Test Reading, Spelling and Arithmetic subtests, and Bender Gestalt scaled scores. Academic variable measures included recent school grades in five diverse core subject areas, school grade in which academic difficulties were first noticed, and grade repeated, if any. Behavioral variable measures involved forty classroom behaviors rated by each child's homeroom teacher, and included such classroom behaviors as "distractible", "tries hard", "gives up easily", etc.

Procedure: Children were all classified into a given diagnostic category on the basis of a neurological evaluation, psychometric testing, a complete reading evaluation, consideration of detailed school information, and relevant medical and family history, by a multidisciplinary team representing specialists from pediatric neurology, psychology, reading, and special education.

The children involved in the study had all been drawn from a much larger sample, from which had been excluded all children whose problems were considered to exist in more than one of the four major diagnostic categories.

Separate analyses of variance were computed among diagnostic categories on Wechsler full scale, verbal and performance IQ scales, as well as on each WISC subscale; Raven Progressive Matrices; Bender Gestalt standard scores; Wide Range Achievement Test scaled scores for reading, spelling, and arithmetic; differences between WISC full scale IQ scores and Wide Range Achievement Test scaled scores; school grades in each core area; school grade in which academic difficulties were first noticed, and grades repeated, if any. For each individual analysis, Bartlett test for homogeneity of variance was computed, and in cases where $p < .05$ the Welch test was used. When the F probability of any individual analysis was less than .05, T tests between individual means were computed. To compare the four groups on classroom behaviors, independent binomial comparisons were computed on each of the 40 classroom behavioral variables.

RESULTS

Wechsler full scale, verbal, or performance IQ measures did not differentiate among minimally brain injured, emotionally disturbed, and specific learning disabled groups,* and the only Wechsler subtest which differed among groups was the Object Assembly scale (Table 1). Grade levels when problems were first noticed differed among diagnostic groups, with the dull normal and brain injured children being identified much younger than the emotionally disturbed and learning disabled children (Table 2).

Raven performance differed significantly among the four groups ($F = 4.48$; $p = .013$), and T tests between minimally brain injured and dyslexic and between minimally brain injured and emotionally disturbed children were both significant ($p < .05$ and $p < .01$, respectively). Bender scaled scores were well below full scale IQ scores for all diagnostic groups except the dull normal IQ group, but there were no significant differences on Bender performance among groups ($p = .571$

Consistent differences were manifest among the four groups on difference scores between full scale (WISC) IQ and Wide Range Achievement Test scaled scores on reading and spelling ($p < .0001$ and $p < .02$). On both reading and spelling scaled scores, the brain injured and dull normal children showed the smallest discrepancies between IQ and achievement levels, and the learning disabled children showed the greatest discrepancies (Table 3). Individual T tests on IQ and reading scaled score differences were significant between learning disabled and brain injured children ($T = 4.904$; $p < .005$), and between learning disabled and emotionally disturbed children ($T = 2.267$; $p < .01$). Individual T tests on IQ and spelling scaled scores differences were also significant between learning disabled and emotionally disturbed children (T's = 2.230 and 2.218, both $p < .05$). The use of the Wide Range reading scores by themselves did significantly differentiate among the four groups, but only the T test between the learning disabled and brain damaged children was significant ($T = 2.420$, $p < .05$).

Overall school grades did not differentiate among diagnostic groups, whose mean grade point averages were remarkably similar. Academic areas involving poorest performance for all groups typically involved reading and arithmetic, with the minimally brain injured group also doing quite poorly on handwriting. The specifically learning disabled children were significantly better than other

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* For the analysis of variance involving WISC measures, the dull normal intelligence category was deleted before comparison, since the criterion of classification into this category involved, in effect, significantly lower scores.

children in physical education, and the emotionally disturbed children were significantly better in music (Table 4).

Grades repeated showed some rather striking differences, with the dull normal group more likely to have repeated kindergarten than all other groups combined. Specifically learning disabled children had more failures in grade one than in all other school grades combined. By grades four and five, neither the dull normal nor minimally brain injured children showed much likelihood of repeating a grade, although the dull normal children showed a strong likelihood of repeating in grades kindergarten through two (Table 5).

Behavioral characteristics by diagnostic classification demonstrated a number of consistent profiles among groups. Minimally brain injured children were more likely to seek attention, be more restless, and try harder. Dull normal children were easier to control, but had shorter attention spans than other children. Specifically learning disabled children were less anxious and displayed fewer nervous mannerisms, but had poorer awareness of time. Emotionally disturbed children were much more likely to be either ignored or teased by other children, and to present serious discipline problems (Figures 1, 2, 3, 4).

DISCUSSION

In general, psychometric test scores by themselves were not compellingly effective in distinguishing among groups. The use of absolute measures which are fairly commonly used in the diagnosis of minimal brain damage, such as depressed Bender Gestalt or WISC block design subtest scores, were found to be of extremely limited value for differential diagnosis in a mixed diagnostic group. When used in terms of discrepancies, however, there was considerably greater success, as manifest in the striking differences among groups between IQ scores and WRAT standard scores, or between IQ scores and Raven standard scores.

What was perhaps most intriguing was the fact that the classroom teachers who referred the children for comprehensive evaluation were able to provide data which by itself was the strongest single predictor for subsequent diagnostic classification. On the basis of classroom behavior, for example, it was possible to construct more or less mutually exclusive profiles of the four types of educational handicaps, and to use this data at least as the bases for forming some initial working hypotheses concerning subsequent diagnostic considerations. On a more speculative level, it may well be reasonable for school psychologists to begin considering ways to use data available from referral information as a primary source of diagnostic data, with formal psychological testing invoked as a final step in definitive differential diagnosis. In any case, data from this investigation suggest that sources of information peripheral and preliminary to traditional diagnostic procedures may well contain information of considerable value in the ultimate diagnosis of various types of learning handicaps.

REFERENCE

Hartlage, L. C. Differential diagnosis of dyslexia, minimal brain damage and emotional disturbances in children. Psychology in the Schools, 1970, 7(4), 403-406.

Table 1

Wechsler Verbal, Performance, and Full Scale I.Q., and Subtest Scaled Score Differences Between Emotionally Disturbed, Brain Injured, and Learning Disabled Children

		DIAGNOSTIC CATEGORY MEAN SCORES				
		Emotional	Brain Injured	Learning Disabled	F Ratio	Probability
	WISC FS IQ	100.59	96.06	100.44	2.336	>.10
	WISC V IQ	99.98	97.25	98.77	.615	>.55
	WISC P IQ	101.02	95.45	102.82	2.712	>.07
SCALED SCORES	Information	9.85	9.64	8.88	1.345	>.27
	Comprehension	9.91	10.12	10.14	.066	>.94
	Arithmetic	8.87	8.52	8.68	.254	>.78
	Similarities	11.69	10.47	10.82	2.943	>.06
	Vocabulary	10.97	10.70	10.58	.253	>.77
	Digit Span	8.70	9.66	9.34	.205	>.82
	Picture Comp.	10.27	10.12	10.00	.105	>.90
	Picture Arr.	10.18	10.10	13.45	.818	>.45
	Block Design	10.50	9.25	10.17	2.280	>.11
	Obj. Assembly	10.77	9.04	11.11	6.851	<.01*
	Coding	9.14	8.12	12.17	2.129	>.13

Table 2

Mean Age and Grade Levels at Which Learning Disabled, Emotionally Disturbed, Mentally Subnormal, and Brain Injured Children were Referred for Comprehensive Diagnostic Evaluation

	Emotional	Brain Injured	Dull Normal	Learning Disabled	F Ratio	Probability
Age	10.0	9.1	9.4	10.3	5.708	$<.005$
Grade	3.7	2.7	2.8	4.0	4.986	$<.015$

Table 3

Differences Between Full Scale I.Q. Scores and WRAT Reading and Spelling Scaled Scores in Emotionally Disturbed, Brain Injured, Dull Normal, and Learning Disabled Children

	Emotional	Brain Injured	Dull Normal	Learning Disabled	F Ratio	Probability
Reading	17.23	12.21	6.62	23.14	19.305	$<.0001$
Spelling	18.31	16.12	8.10	23.70	5.081	$<.01$

Table 4

Recent School Grades of Children by Diagnostic Group

	Grade Point Average*			
	Emotionally Disturbed	Dull Normal	Minimally Brain Damaged	Specific Learning Disabled
Reading	4.11	3.91	4.19	4.38
Arithmetic	3.83	4.12	3.91	4.04
Handwriting	3.59	3.69	3.97	3.64
P. E.	3.06	3.21	3.35	2.71
Music	2.91	3.67	3.42	3.32
Grade Point Average	3.54	3.77	3.71	3.73

* 1 = A, 5 = Failing

Table 5

Grades Repeated, by Diagnostic Category

Grade Repeated	Emotionally Disturbed	Dull Normal	Minimally Brain Damaged	Specific Learning Disabled
None	55	19	53	13
Kindergarten	3	19	3	8
One	25	44	26	62
Two	6	15	12	13
Three	9	4	6	4
Four	0	0	0	4
Five	3	0	0	0

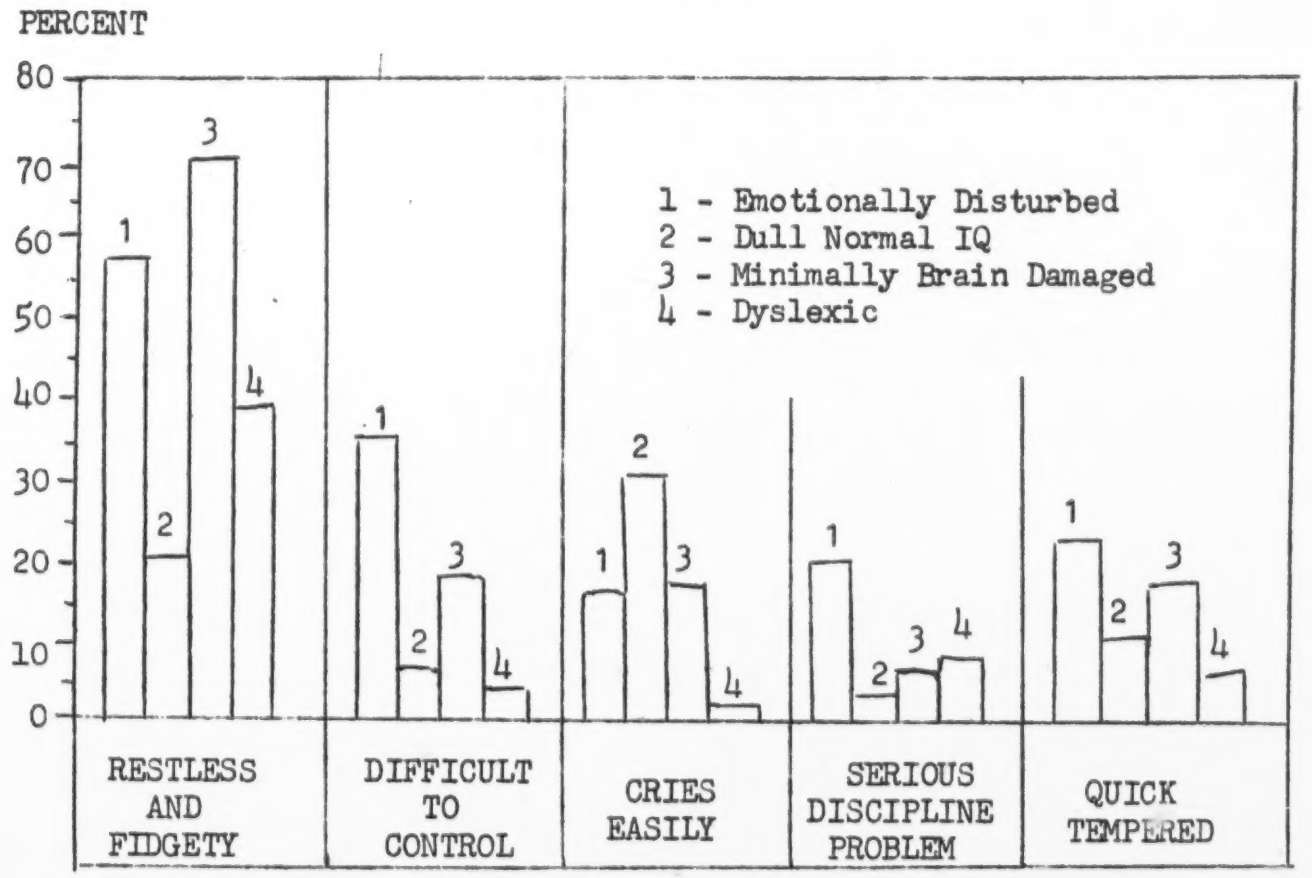

Figure 1. BEHAVIORAL CHARACTERISTICS BY DIAGNOSTIC CLASS

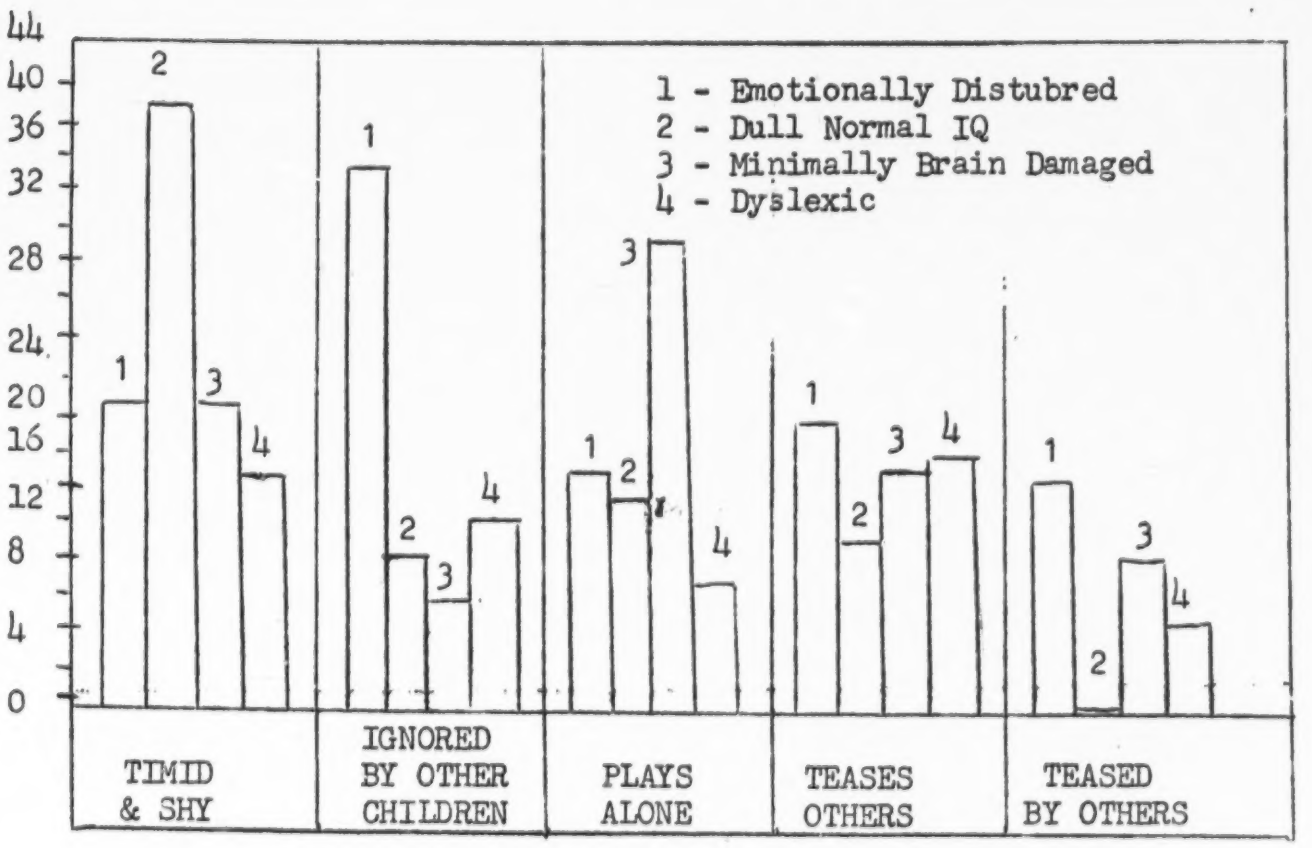

Figure 2. SOCIAL CHARACTERISTICS BY DIAGNOSTIC CLASS

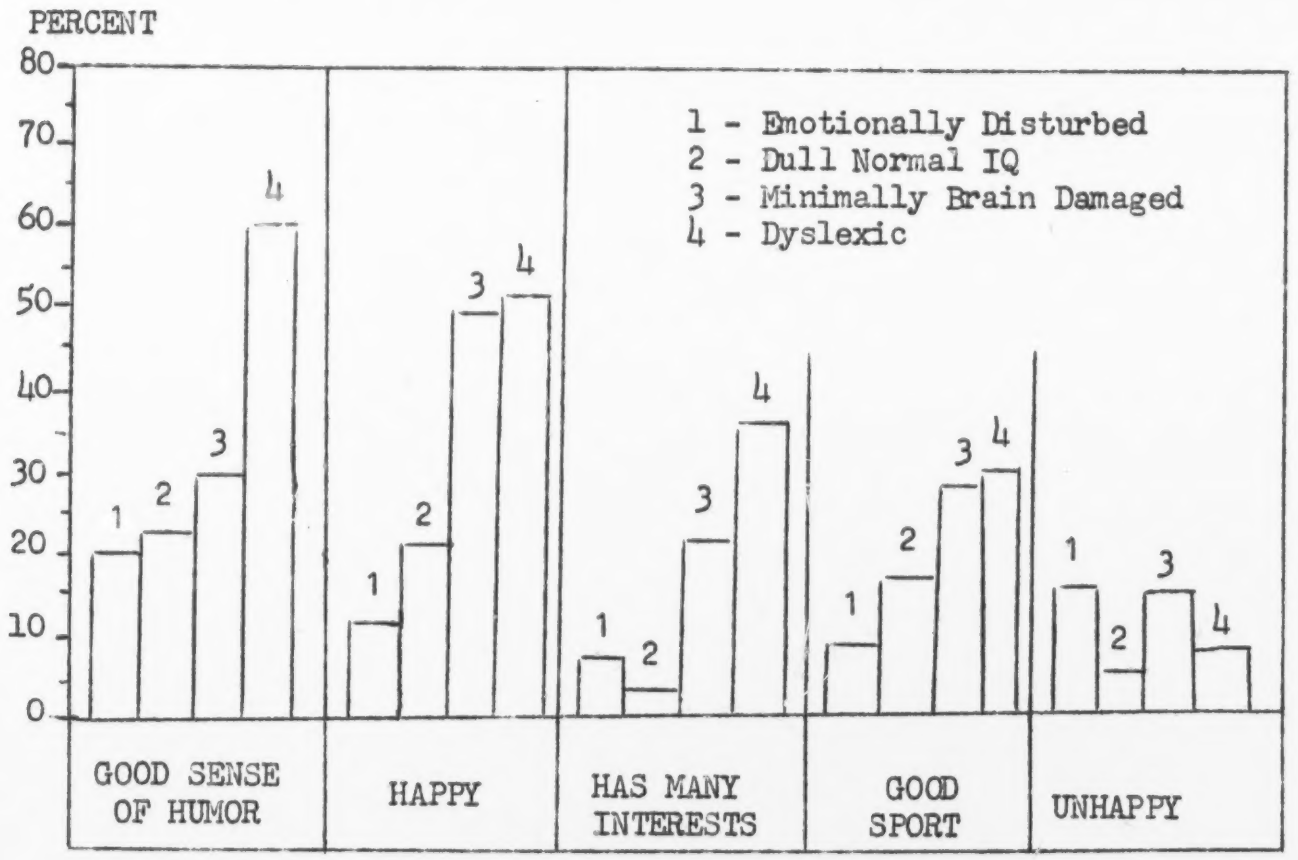

Figure 3. PERSONAL CHARACTERISTICS BY DIAGNOSTIC CLASS

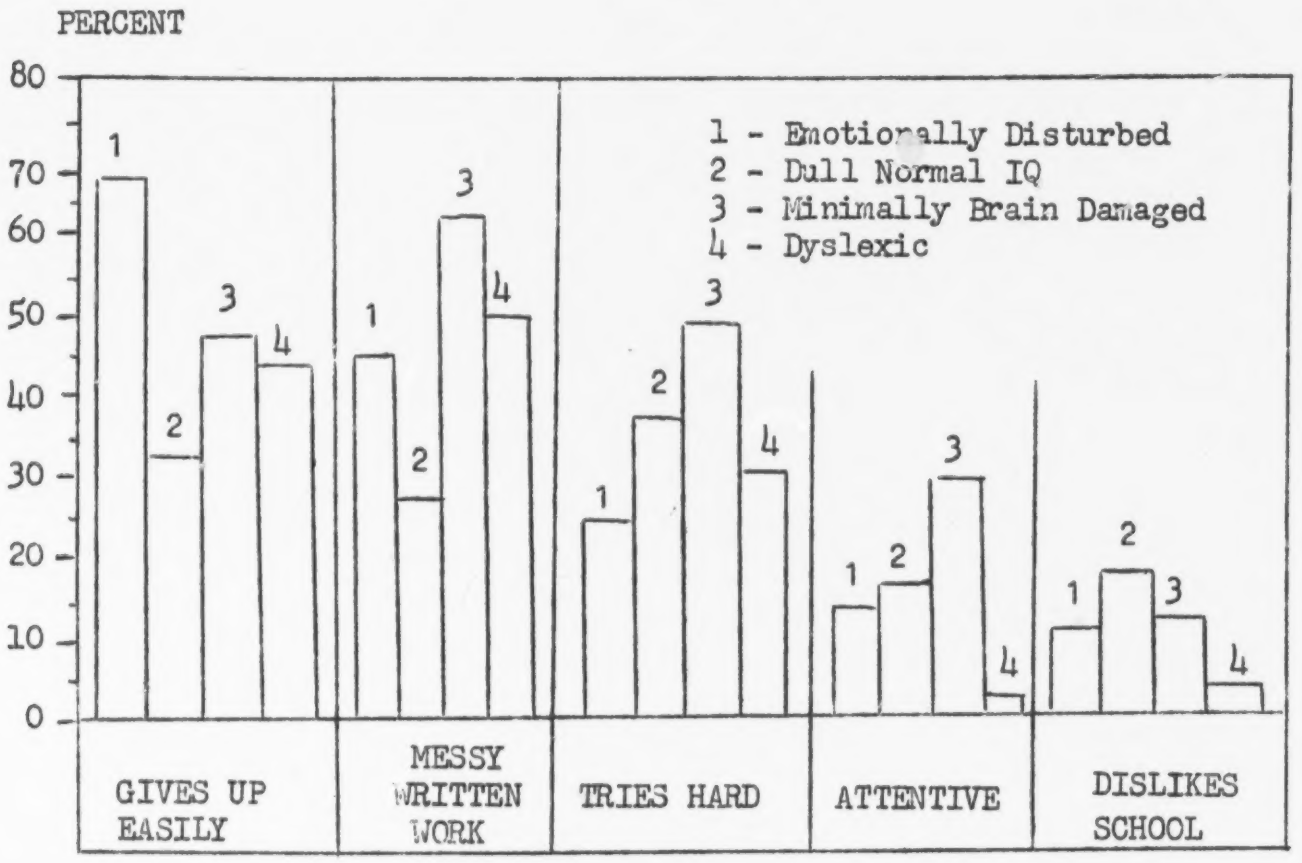

Figure 4. ACADEMIC PERFORMANCE CHARACTERISTICS BY DIAGNOSTIC CLASS